WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a first back-illuminated semiconductor image pickup element; and

a second semiconductor image pickup element made of a semiconductor material different from that of said first back-illuminated semiconductor image pickup element,

wherein said first back-illuminated semiconductor image pickup element is disposed such that respective photosensitive regions of said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are adjacent to each other.

2. The semiconductor device as recited in claim 1, characterized in that mutually opposite faces of said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are adhered via a resin.

3. The semiconductor device as recited in claim 1, characterized in that mutually opposite faces of said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element are adhered via at least three or more bumps.

4. The semiconductor device as recited in claim 3, characterized in that said first back-illuminated semiconductor image pickup element comprises a shift register

as formed over said first back-illuminated semiconductor image pickup element, that said shift register is electrically connected via said bumps to said second semiconductor image pickup element, and that a signal from said second semiconductor image pickup element is read by driving said shift register.

5. The semiconductor device as recited in claim 1, characterized in that said first back-illuminated semiconductor image pickup element contains Si.

6. The semiconductor device as recited in claim 5, characterized in that said second semiconductor image pickup element contains a compound semiconductor.

7. The semiconductor device as recited in claim 6, characterized in that said compound semiconductor includes InGaAs.

8. The semiconductor device as recited in claim 1, characterized in that a cooler is in contact with a face of the second semiconductor image pickup element on the opposite side to said first back-illuminated semiconductor image pickup element.

9. The semiconductor device as recited in claim 8, characterized in that said first back-illuminated semiconductor image pickup element and said second semiconductor image pickup element partly overlap and that a substrate containing the same material as said second semiconductor image pickup element is contacted with a region

at said first back-illuminated semiconductor image pickup element which does not overlap said second semiconductor image pickup element.